**Fill in the following table**.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Element | Symbol | Group | Period | Block | Electron Configuration | Family |
| Mercury | Hg | 12 | 6 | d | [Xe] 6s2 4f145d10 | Transition Metal |
| Boron | B | 13 | 2 | p | 1s2 2s22p1 | Metalloid |
| Potassium | K | 1 | 4 | s | [Ar] 4s1 | Alkali Metal |
| Krypton | Kr | 18 | 4 | p | [Kr] | Noble Gas |
| Lead | Pb | 14 | 6 | p | [Xe] 6s2 4f145d106p2 | Other Metal |
| Uranium | U | X | 7 | f | [Rn] 7s2 6d15f3 | Inner Transition Metal  or  Actinide |
| Chlorine | Cl | 17 | 3 | p | [Ne] 3s23p5 | Halogen |
| Lutetium | Lu | X | 6 | f | [Xe] 6s25d14f14 | Inner Transition Metal  or  Lanthanide |
| Radium | Ra | 2 | 7 | s | [Rn] 7s2 | Alkaline Earth Metal |
| Carbon | C | 14 | 2 | p | 1s2 2s22p2 | Nonmetal |

Metals, Non-Metals and Metalloids

Identify each of the following as metal, non-metal or metalloid. Also identify each as a representative group element or transition element.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Metal | Non-metal | Metalloid | Representative | Transition |
| Oxygen (O) |  | x |  | x |  |
| Barium (Ba) | x |  |  | x |  |
| Germanium (Ge) |  |  | x | x |  |
| Iron (Fe) | x |  |  |  | x |
| Neon (Ne) |  | x |  | x |  |
| Praseodynium (Pr) | x |  |  |  | x |

Which of the following elements are likely to conduct electricity? (Circle all that apply)

Cl Sr Li Ar Sn C Br Cu

Which of the following are likely to be brittle solids or gases at room temperature? (Circle all that apply)

Cl Sr Si Li Ar Sn C Br

The description applies to a metal, a nonmetal, or a metalloid. Write the correct letter in the space provided. Letters can be used more than once.

C 1. are malleable

a. metalloids

b. nonmetals

c. metals

A 2. are dull or shiny

B 3. are poor conductors

B 4. tend to be brittle and unmalleable as solids

C 5. are almost always shiny

A 6. are also called semimetals

B 7. are almost always dull

A 8. are somewhat ductile

A 9. include boron, silicon, antimony

C 10. include lead, tin, copper

B 11. include sulfur, iodine, neon

**Use the Periodic Table and your knowledge of periodic trends to answer the following questions.**

1. Which atom in each pair has the **larger** atomic radius?

a) O or C b) Be or Ba

2. Which atom in each pair has the **smaller** ionization energy?

a) Na or Al b) N or P

3. Which atom in each pair has the **larger** electronegativity?

a) Al or Si b) Na or K c) O or P

1. Which is bigger: S1-atom or the S2- ion? \_\_\_\_ Which is bigger, the Mg1+atom or the Mg2+ ion? \_\_\_\_\_

5. Consider atoms of the following, which are located as shown in the Periodic Table: 16S 17Cl

34Se 35Br

a) Which has the **highest** electronegativity? 17Cl

b) Which has the **highest** ionization energy? 17Cl

c) Which has the **smallest** atomic radius? 17Cl

6. Explain the relationship between

a) the size of a positive ion and its atom b) the size of a negative ion and its atom

+ ion<neutral atom - ion>neutral atom

7. Which ion in each pair has the **smaller** ionic radius?

a) Na+ or Cs+ b) P3- or S2- c) F- or S2-

8. Why do atoms get smaller going across a period?

The charge on the nucleus increases as does the electrostatic force that the nucleus exerts on the valence electrons which are all at the same energy level.

9. Why do nonmetals have high ionization energies?

Non-metals naturally attract electrons (high electronegativity relative to metals). Therefore, it takes a greater amount of energy to remove electrons from these atoms.

10. Define electronegativity. What is the periodic trend for electronegativity?

Electronegativity: The ability of atoms to attract electrons.

Across a period (from left to right) electronegativity increases

Down a group, electronegativity decreases

**Valence Electrons**

Determine the number of valence electrons for each for the following elements and draw their Lewis Dot Structures.

|  |  |  |
| --- | --- | --- |
| Element | # of Valence Electrons | Lewis Dot Structure |
| Calcium | 2 |  |
| Silicon | 4 |  |
| Xenon | 8 | http://tinyjim.tripod.com/ptable/xe.gif |
| Oxygen | 6 |  |